123c Assessing and Improving the Stability of Organic Monolayer Coatings

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Their small size, low cost, and ease of manufacture make silicon based MEMS devices attractive candidates for future therapeutic applications. However, the negative charge of the native oxide surface makes such devices particularly prone to non-specific protein adsorption and biofouling. One approach to address this problem has been to coat such devices with organic monolayers. This work will address the thermal and aqueous immersion stability of various monolayers on silicon surfaces. Monolayers produced from precursors that use trichlorosilane, trimethoxysilane, and alkene binding chemistry will be applied to silicon surfaces, and the film properties will be assessed by atomic force microscopy and contact angle analysis before and after thermal cycling and aqueous immersion. Furthermore, those monolayers that form on silicon oxide will also be deposited onto an adhesion layer, and the properties of these films will be compared to films in which no adhesion layer was used.